APPENDIX B

NATIONAL TRANSPORTATION

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NATIONAL TRANSPORTATION

Transportation of waste to Nevada is assumed to be via two primary transportation modes: rail and truck. Heavy haul or barge may be required at some reactor sites to move the casks from the reactor to a location where the cask can be transferred to rail. In the reference scenario, the majority of the waste is transported by rail from the source to the repository. Only 11 facilities require the use of trucks for the movement of the waste due to site limitations. All canisters of high-level waste, with or without plutonium, and DOE SNF are assumed to move by rail in a typical scenario.

The waste is to be transported in casks certified by the NRC. Cask characteristics that were assumed for the analyses of the program implementation scenarios are presented in Table B-1.

Commercial SNF loaded from reactor pools was shipped in canisters if the repository receiving facility could not handle uncanistered fuel; otherwise, uncanistered SNF was shipped. DPCs were assumed to be used for dry storage by rail-capable reactor sites. When shipping canistered fuel, commercial SNF rail sites capable of handling >100 tons used large DPCs (61BWR/24PWR), 100 ton-capable sites used medium DPCs (44BWR/21PWR), and the remaining sites used small 75 ton DPC casks (24BWR/12PWR). Sites using small 75 ton DPC casks could instead employ the DTS to load large DPCs, and the resulting CRWMS transportation costs would be reduced from those calculated for this study.

When shipping uncanistered fuel, only large (>100 ton-61BWR/26PWR) and small rail (75 ton-24BWR/12PWR) single purpose casks (SPCs) were assumed to be available. The analyses assumed that the same large cask overpack would be used for shipping both canistered and uncanistered fuel, with the SNF basket removed or installed as necessary. Only the sites capable of handling more than 100 tons used the large cask. Other sites used the small casks. Truck facilities used a cask similar to the GA4/9 cask (4PWR/9BWR).

The cask handling capabilities for each of the reactor pools are shown in Tables B-2 through B-5.

Rail shipments were assumed to be by general freight. Each shipment is assumed to deliver one loaded cask or to return one unloaded cask.

Table B-1. Characteristics of Transportation Casks

Cask	Waste form	Mode	Waste Type	Capacity (fuel assemblies or canisters)	Cost (98$M)
GA-9	Uncanistered	Truck	BWR	9	$2.9
GA-4	Uncanistered	Truck	PWR	4	$2.6
NAC LWT	Uncanistered	Truck	PWR/BWR	1/2	$2.0
High-Heat Rail	Uncanistered	Rail	PWR/BWR	7/17	$4.5
Large-SPC	Uncanistered	Rail	PWR/BWR	26/61	$4.6
Small-SPC	Uncanistered	Rail	PWR/BWR	12/24	$3.3
Large-DPC	Canistered	Rail	PWR/BWR	24/61	$4.6
Med-DPC	Canistered	Rail	PWR/BWR	21/44	$3.8
Small-DPC	Canistered	Rail	PWR/BWR	12/24	$3.3
Yankee Rowe-DPC	Canistered	Rail	PWR	36	$4.2
Big Rock-DPC	Canistered	Rail	BWR	74	$3.6
MOX (large SPC)	Uncanistered	Rail	PWR	9	$3.8
South Texas	Uncanistered	Rail	PWR	12	$3.6
High-Level Waste without Immobilized Plutonium	Canistered	Rail	High-Level Waste without Immobilized Plutonium	5	$3.7
High-Level Waste with Immobilized Plutonium	Canistered	Rail	High-Level Waste with Immobilized Plutonium	2/3*	$3.7
High-Level Waste without Immobilized Plutonium-Long	Canistered	Rail	High-Level Waste without Immobilized Plutonium	5	$4.7
High-Level Waste without Immobilized Plutonium-Truck	Canistered	Truck	High-Level Waste without Immobilized Plutonium	1	$3.7
High-Level Waste with Immobilized Plutonium	Canistered	Truck	High-Level Waste with Immobilized Plutonium	1	$3.7
High-Level Waste without Immobilized Plutonium-Truck-Long	Canistered	Truck	High-Level Waste without Immobilized Plutonium	1	$4.7
DOE SNF Truck	Canistered	Truck	DOE SNF	1	
Rail type 1	Canistered	Rail	DOE SNF	4	
Rail type 2	Canistered	Rail	DOE SNF	3	
Rail type 3	Canistered	Rail	DOE SNF	6	
Rail type 4	Canistered	Rail	DOE SNF	5	
Rail for Naval SNF	Canistered	Rail	Naval SNF	1	

* 2 canisters of high-level waste with immobilized plutonium and 3 canisters of high-level waste without immobilized plutonium

Table B-2. Pools with Capability to Handle 125 Tons or More

	Pool Name	Fuel Type
1	BEAVER VALLEY 1	PWR
2	BEAVER VALLEY 2	PWR
3	BIG ROCK 1	BWR
4	BRAIDWOOD 1	PWR
5	BYRON 1	PWR
6	CALLAWAY 1	PWR
7	CATAWBA 1	PWR
8	CATAWBA 2	PWR
9	COMANCHE PK 1	PWR
10	DAVIS-BESSE 1	PWR
11	FARLEY 1	PWR
12	FARLEY 2	PWR
13	FITZPATRICK	BWR
14	GRAND GULF 1	BWR
15	HATCH 1	BWR
16	HOPE CREEK	BWR
17	LASALLE 1	BWR
18	MAINE YANKEE	PWR
19	MORRIS	BWR/PWR
20	NORTH ANNA 1	PWR
21	PALO VERDE 1	PWR
22	PALO VERDE 2	PWR
23	PALO VERDE 3	PWR
24	PERRY 1	BWR
25	POINT BEACH 1	PWR
26	RANCHO SECO 1	PWR
27	RVR BEND 1	BWR
28	SAN ONOFRE 1	PWR
29	SAN ONOFRE 2	PWR
30	SAN ONOFRE 3	PWR
31	SEABROOK 1	PWR
32	SEQUOYAH 1	PWR
33	SOUTH TEXAS 1	PWR
34	SOUTH TEXAS 2	PWR
35	SUMMER 1	PWR
36	SURRY 1	PWR
37	SUSQUEHANNA 1	BWR
38	TROJAN	PWR
39	WASH NUCLEAR2	BWR
40	WATERFORD 3	PWR
41	WATTS BAR 1	PWR
42	WOLF CREEK 1	PWR
43	YANKEE-ROWE 1	PWR

Note: These sites can handle Large DPCs and Large SPCs.

Table B-3. Pools with Capability to Handle Between 100 and 124 Tons

	Pool Name	Fuel Type
1	3 MILE ISL 1	PWR
2	ARK NUCLEAR 1	PWR
3	ARK NUCLEAR 2	PWR
4	BROWNS FERRY1	BWR
5	BROWNS FERRY3	BWR
6	CALVERT CLF 1	PWR
7	CLINTON 1	BWR
8	COOK 1	PWR
9	DIABLO CANYON 1	PWR
10	DIABLO CANYON 2	PWR
11	ENRICO FERMI2	BWR
12	KEWAUNEE	PWR
13	LIMERICK 1	BWR
14	MCGUIRE 1	PWR
15	MCGUIRE 2	PWR
16	MILLSTONE 3	PWR
17	NINE MILE PT1	BWR
18	NINE MILE PT2	BWR
19	OCONEE 1	PWR
20	OCONEE 3	PWR
21	OYSTER CRK 1	BWR
22	PALISADES	PWR
23	PEACHBOTTOM 2	BWR
24	PEACHBOTTOM 3	BWR
25	PRAIRIE ISL 1	PWR
26	SALEM 1	PWR
27	SALEM 2	PWR
28	ST LUCIE 2	PWR
29	TURKEY PT 3	PWR
30	TURKEY PT 4	PWR
31	ZION 1	PWR

Note: These sites can handle medium DPCs or small SPCs.

Table B-4. Pools that Can Handle 75 to 99 Tons

	Pool Name	Fuel Type
1	BRUNSWICK 1	BWR/PWR
2	BRUNSWICK 2	BWR/PWR
3	COOPER STN	BWR
4	DRESDEN 1	BWR
5	DRESDEN 2	BWR
6	DRESDEN 3	BWR
7	DUANE ARNOLD	BWR
8	FORT CALHOUN	PWR
9	HARRIS 1	BWR/PWR
10	MILLSTONE 1	BWR
11	MILLSTONE 2	PWR
12	QUAD CITIES 1	BWR
13	ROBINSON 2	PWR
14	VOGTLE 1	PWR
15	VT YANKEE 1	BWR

Note: These sites can handle small SPCs and small DPCs.

Table B-5. Pools that Can Handle Only Truck Casks

	Pool Name	Fuel Type
1	CRYSTAL RVR 3	PWR
2	GINNA	PWR
3	HADDAM NECK	PWR
4	HUMBOLDT BAY	BWR
5	INDIAN PT 1	PWR
6	INDIAN PT 2	PWR
7	INDIAN PT 3	PWR
8	LACROSSE	BWR
9	MONTICELLO	BWR
10	PILGRIM 1	BWR
11	ST LUCIE 1	PWR

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